

APPLICATION

FOR

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FOR

MEANS OF ATTACHING RIGID PAGES TO A BOOK-LIKE COVER

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# **MEANS OF ATTACHING RIGID PAGES TO A BOOK-LIKE COVER**

This application claims the benefit of U.S. Provisional Application No. 60/446,554, filed February 12, 2003.

## **BACKGROUND OF THE INVENTION**

Data storage devices are delicate devices that are easily damaged by scratches, dirt and other consequences of handling. As such, there is a need for carrying cases and other storage mechanisms that protect compact discs, DVDs and other digital and analog media devices during transport and between uses.

Additionally, data storage devices are often used as advertising mechanisms to sell contents. Data storage devices are often displayed directly on shelves in retail stores. Attractive packaging designs provide benefits in sales.

Most storage mechanisms for digital media and other devices are capable of storing only one or two discs at a time. A common media storage device is a jewel case for storing compact discs. In a jewel case, a disc fits into a plastic tray and a hinged cover snaps onto the tray to close the jewel case. Two discs may be held in a jewel case if a double-sided tray is used inside the case. However, jewel cases are not visually appealing, are difficult to open and often break. Similar problems exist with packaging for DVDs.

Methods for carrying and storage of multiple digital discs are also unsatisfactory. Multiple disc carriers often involve bulky and hard to use cases that allow the user to carry multiple discs at once. Most of these devices are not user-friendly and are not visually appealing.

Needs exist for improved methods for storing, protecting and displaying data storage devices in a less expensive and more visually appealing manner.

## **SUMMARY OF THE INVENTION**

The present invention is a method of attaching rigid pages to each other and to a book-like cover to form a package for holding, protecting and displaying data storage devices.

Flexible plastic strips, preferably dovetail shaped clips, are used to secure trays to one another and to the book-like cover. The clips may have a trapezoidal shape with a triangular recess that allows them to bend along a central, longitudinal living hinge axis. If multiple trays are being used, multiple tray holder clips can be strung together with living hinges that allow the user to flip through the trays of the novel package without damaging the clips. The living hinges slightly raise the next adjacent tray while the user is flipping to make the package easier to use. Anti-tear hinges prevent the living hinges from ripping.

The tray holder clips have tray engagement sides with end connectors for fitting into one or more spaced complementary mounting recesses in the edges of the trays. Each end connector has split aligning projection receivers at the extremities for receiving complementary aligning projections in the mounting recesses. The tray holder clips also have openings for receiving securing projections in the tray edge mounting recesses. The securing projections include projections with enlarged detent ends for fitting inside the openings. They cooperate with the internal shapes of the openings. The securing projections and the detents cooperate with holes and the snaps for locking the holder slips inward and for holding the receivers laterally outward for engaging the aligning projections. The openings have internal snaps for cooperating with the end connectors and receivers extending outward.

The individual trays may have at least one depression with a central rosette for holding a digital media disc. There may also be finger holds along the depression to make extracting the digital media disc easier. There is also a rim the trays and lugs around the rim for holding a

graphic card on a side of the tray opposite the depression. An individual tray may also have opposite depressions with opposite rosettes for holding two media discs on opposite sides of the tray.

Preferably, both the tray holder clips and the mounting recesses are dovetail shaped. The mounting recesses are narrower at the connecting edge and wider further toward the center of the tray.

Additionally, there may be at least one end tray with mounting recesses on a mounting edge. Preferably, there may be two opposite end trays. One or more of the end trays may be deep trays with similar connection mechanisms to the central or end trays. The end tray may be used to hold pamphlets, booklets, literature or other materials. The end tray or other trays may have inward extending literature clips near an edge opposite the mounting edge to hold any extra materials.

The free edges of plural trays may have aligned fastener recesses. A flexible fastener strip has two ends, one with a first connector. The first tray in a stack of trays has a flap with a second connector. The flexible fastener strip lies within the aligned fastener recesses when first and second complementary connectors are connected. The end of the flexible fastener strip without the connector is attached to the bottom tray. The second end of the flexible fastener strip has a hook that engages one of a series of holes on the base of the bottom tray. This flexible fastener strip may be used with a book cover.

The book-like cover can be of a various thickness or have graphics imprinted upon it. The cover wraps around stacked plastic trays or pages. The plastic trays hold compact discs, DVDs, descriptive booklets and other materials on the front, back or both surfaces. Both the front and back of the trays can hold media devices or booklets and the trays fit front to back to

avoid movement relative to one another. A locking rib on the trays fits tightly with a locking groove on the clips.

The package of the present invention can be made as large or small as needed by simply adding additional trays and increasing the width of a flexible spine material. The flexible material is located between the front and back panel of the package cover and is the place where the trays are attached to the cover. Two parallel strips are cut in the flexible spine material to allow bent, dovetail shaped clips to pass through the flexible material and into corresponding dovetail shaped mounting recesses on the trays. The clips trap the flexible spine material between the locked clips and the trays. One or more sets of dovetail shaped clips are used to hold trays to the cover.

To create a package, a stack of trays is formed. Each tray has end flanges and recessed edges for receiving the flanges of a next adjacent tray in order to avoid sliding movement of the trays relative to one another. Then, the cover and flexible spine material is overlaid so that the cutout openings are over the dovetail shaped mounting recesses on the trays. The clips are then bent and passed through the flexible spine material. Pressure is applied to the bent clips and the clips return to their original configuration and lock into the dovetail shaped mounting recesses. Thus, the trays are attached securely to the book-like cover.

These and further and other objects and features of the invention are apparent in the disclosure, which includes the above and ongoing written specification, with the drawings.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows a single dovetail shaped clip.

Figure 2 shows multiple dovetail shaped clips and the corresponding female dovetail shaped mounting recesses on trays.

Figure 3 shows the dovetail shaped clip bent prior to insertion into the mounting recess.

Figure 4 shows the locking ribs on the trays and the corresponding groove on the clip.

Figure 5 shows the end of the package showing a clip attached to a tray in the open position.

Figure 6 shows the top of the package showing a clip attached to a tray in the open position.

Figure 7 shows the side of the package showing a clip fully inserted into a mounting recess.

Figure 8 shows a stack of trays with mounting recesses.

Figure 9 shows the front and back cover and the flexible spine material with cutouts.

Figure 10 shows a stack of trays with the flexible spine material about to be overlaid and clips in position.

Figure 11 shows the bending of the clips to fit within the cutouts in the flexible spine material.

Figure 12 shows the installed clips with the spine material trapped between the clip and tray.

Figure 13 shows a media holder set and a book cover.

Figure 14 shows a media holder set in a book cover.

Figure 15 shows a book with a deep tray.

Figure 16A is a top perspective view of a tray holding clip.

Figure 16B is a top view of a tray holding clip.

Figure 17A is a bottom perspective view of a tray holding clip.

Figure 17B is a bottom view of a tray holding clip.

Figure 18 is a front view of a tray.

Figure 19 is a perspective view of the tray showing the connecting edge.

Figure 20 is a perspective detail of the tray connecting edge.

Figure 21 is a perspective detail of the tray free edge.

Figure 22 is a front view of a tray with a graphics card.

Figure 23 is a rear view of a tray with a graphic card.

Figure 24 is a front perspective view of a tray combination in a carrying case.

Figure 25 is a rear perspective view of a tray combination in a carrying case.

Figure 26 is a rear detail of hinged clips holding the elements of the carrying case.

Figure 27 is a detail of a fastener strip.

Figure 28 is a detail of a handle.

Figure 29 shows a handle inserted in the deep tray of the carrying case.

Figure 30 is a perspective front view of a double-sided rosette used with a double-sided holder tray.

Figure 31 is a perspective rear view of a double-sided rosette used with a double-sided holder tray.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

The present invention is a book format package for holding compact discs, DVDs, booklets and other data storage devices and a method for attaching plastic trays to one another and attaching the trays to a book-like cover.

Figure 1 shows a strip of plastic having a central longitudinal living hinge. Preferably, the strip of plastic is a dovetail shaped clip 11. The clip 11 is basically trapezoidal in shape, with two angled sides 25, 27, a top surface 23 and a bottom surface 29. The clip 11 also has a roughly triangular shape 13 removed from the side surface 31. The clip 11 is molded from plastic or another suitably strong and flexible material. The triangular recess 13 allows the clip 11 to bend along a top surface 23 at the peak 15 of the triangular shape 13 when pressure is applied to the ends 17, 19 of the clip 11. The clip 11 also has a locking groove 21 molded into the bottom surface 29 of the clip 11. The locking groove 21 may be triangular or another shape.

Figure 2 shows two dovetail shaped clips 11 and corresponding dovetail shaped mounting recesses 33 on trays 35 or pages that make up a package. The mounting recesses 33 are located on an edge 37 of the trays 35. The trays of the package book are plastic trays 35 that hold data storage devices such as compact discs, DVDs or other devices. The front 39, back 41 or both surfaces of each tray 35 are capable of holding a data storage device.

A completed package can accommodate from one to an infinite number of trays 35. The use of multiple trays 35 in a package requires multiple clips 11. Multiple clips are connected together by living hinges 45. These living hinges 45 allow a user of the package to flip through the trays 35 without separating or breaking the clips 11 apart. As an additional precaution, anti-tear hinge ribs 47 may be molded into the clips 11 and hinges 45 of the present invention. The anti-tear hinge ribs 47 reinforce the living hinges 45 to allow for more extensive bending of the



hinges 45. The living hinges 45 are molded during molding of the clips 11 to ensure a solid connection. The clips 11 ensure that the trays 35 do not move relative to one another. With each additional tray 35 added to a stack 43 of trays 35, a corresponding clip 11 is needed to attach the new tray 35 to the package. Individual clips 11 are separated by a space 49 between each clip 11.

Figure 3 shows a dovetail clip 11 in a bent position, ready to be inserted into a dovetail shaped mounting recess 33 of a tray 35. Pressure 51 is applied to the ends 25, 27 of the clip 11 and the clip 11 bends 53 along the peak 15 of the triangular cutout 13. In order to fit the clip 11 into the opening 33, the largest width of the clip 11 must be compressed to a size less than the smallest size of the mounting recess 33 on the outside edge 37 of the tray 35. This allows the clip 11 to pass through top edges 55, 57 of the mounting recess 33 and into the wider opening 59 further into the tray 35.

Figure 4 is a view from the end of the package showing multiple clips 11 attached to multiple trays 35. Each dovetail shaped mounting recess 33 may have a locking rib 61 that fits into the locking groove 21 of each clip 11. When the clip 11 is fully inserted into the tray 35, the locking rib 61 of the tray 35 fits snugly into the locking groove 21 of the corresponding clip 11. The locking ribs 61 can be seen fit into the locking grooves 21 of the clips 11.

Figure 5 shows a view from the end of the package with two clips 11 in a fully opened position. The living hinge 45 is completely flexed.

Figure 6 shows a view from the top of a package showing two clips 11 in a fully opened position. The living hinge 45 is completely flexed. The individual trays 35 may have ridges 63 on one or more edges 65 of each tray 35 that allow for easy alignment of the trays 35 into a stack 43.

Figure 7 shows a view from the top of the package with a clip 11 locked into the dovetail shaped mounting recess 33.

Figure 8 shows a stack of trays 43 with dovetail shaped mounting recesses 33. The openings 33 are at identical locations on each tray 35. When stacked, the top 39 of each tray 35 fits tightly with the bottom 41 of the tray 35 on top. This repeats for as many trays 35 as needed. Each tray has flanges and recessed edges. The recessed edges receive the flanges of the next adjacent tray. This prevents sliding of the trays 35 with respect to one another during production, shipment or use.

Figure 9 shows a front cover 65, back cover 67, flexible spine material 69 and two sets cutout openings 71 on the spine material 69. One or more sets of clips 11 can be used to attach the covers 65, 67 to one or more trays 35. The flexible spine material 69 is attached between the front 65 and back 67 covers, forming a spine of the package. The front 65 and back covers 67 of the package are formed from paper, cardboard, binder's board or other suitable materials. The covers 65, 67 are made from at least one layer of material. Adding additional layers of material, or folding the covers 65, 67 to increase the number of layers can achieve different thickness. Pockets for pamphlets, booklets or other informational materials may be folded into or attached to the covers 65, 67. The flexible spine material 69 is adhered to the covers 65, 67 or is sandwiched between layers of the front 65 and back 67 covers. The front 65, back 67 or both covers of the package may be printed with graphics. The front 65 and back 67 covers may also be made of preprinted graphic materials.

To form a completed package, the covers 65, 67 are folded around the stack 43 of trays 35. Increasing the number of individual trays 35 and the size of the flexible spine material 69

increases the size of the package. During the folding process, the spine material 69 that abuts one edge 37 of the stack 43 of trays 35.

The flexible spine material 69 has cutout openings 71 to allow the covers 65, 67 to be connected to the trays 35. The cutout openings 71 consist of two parallel slits for each clip 11 that is to be used. The openings 71 are spaced such that the bent clips 11 pass through the openings 71. When the bent clips 11 pass through the openings 71, they engage the thin strip 73 of flexible binding material 69 that is between the parallel openings 71. Once the clips 11 are locked into the mounting recesses 33, the thin strip 73 is trapped between the clip 11 and the tray 35. This secures the book-like cover 75 to the stack 43 of trays 35.

Figure 10 shows a stack 43 of trays 35 with the flexible spine material 69 overlaid and the clips 11 preparing to lock the spine material 69 to the trays 35.

Figure 11 shows the process of attaching the trays 35 to the front 65 and back 67 panels of the cover 75, as well as the flexible spine material 69. The clip 11 begins in a relaxed, non-flexed state 77. The clip 11 is then bent 79 far enough to allow passage of the ends 17, 19 through the top edges 55, 57 of the mounting recess 33. The clip 11 is then passed through the flexible spine material 69 by means of the cutout openings 71. The narrow strip 73 of flexible spine material 69 between the cutout openings 71 is pinned between the clip 11 and the tray 35. When the bent clip 11 reaches the mounting recess 33, pressure is applied to the top 23 of the clip 11. This causes the clip 11 to straighten out and the clip 11 becomes locked into the mounting recess 33.

Figure 12 shows the final, locked position of the clip device 11. The narrow strip 73 of flexible binding material 69 is trapped between the tray 35 and the clip 11. This ensures that the

trays 35 are securely attached to the cover 75 and that the package can be operated in a book-like manner.

The trays 35 can be leafed through like the pages of books. As each individual tray 35 is flipped, the next tray 35 partially rises due to the resistance of the living hinges 45. This movement allows the user to more easily grasp the next tray 35 without having to try and separate trays 35 manually. This process is repeated as the user continues through the entire package. Through this process, the user can easily see the data storage devices in the book and quickly flip through the entire book to find the appropriate tray.

Figures 13 and 14 show a book cover 120 with a spine 121 interconnecting cover 117 and back 119.

A holder set 130 includes trays 109 hinged together at connecting edges 131. First and second end trays 133 and 135 have flat outer surfaces 134 which are bonded respectively to inner surfaces of cover 117 and back 119, completing the book 140. Free edges 137 of the trays 109 have fastener recesses 139. A first connector 141 on flap 143 from first end tray 133 engages a second connector 145 on a second, free end 147 of flexible fastener strip 149 to hold book 140 closed. The fasteners and fastener recesses 139 may be omitted.

Figure 15 shows a book with a deep tray 150 as the second end tray that is attached to rear cover panel 119.

The trays 109 have rearward extending rims 151 and depressions 153. Edge recesses or bevels on front edges receive rear edges of the rims to resist sliding of the trays when the book is closed. Depressions 153 hold media discs on central rosettes. Finger holes 155 aid in removal of discs. Literature clips 157 hold booklets inside the first end tray 133. Snaps or micro hook and loop straps 159 are used to hold the book 140 closed.

Figures 16A, 16B, 17A and 17B show strips 161 of tray holder clips 11 that are connected together by living hinges 113. A central living hinge 163 extends along the strip 161 to separate each of the clips 11 into identical sides 165. The dovetail shaped clips 11 have divided ends 167 which form receivers 169 for aligning projections 171 in dovetail shaped mounting recesses 170 in the mounting edges 131 of trays 109, as shown in Figures 18-20. The divided ends 167 of the sides 165 fit in the corners 173 of the mounting recesses 170. Sloping sidewalls 195 of sides 165 have inverted V-shaped grooves 196 to receive the complementary V-shaped sidewalls 197 of the sloping sides 198 of the mounting recesses 170. The mounting recesses have central securing projections 175 with extended enlarged securing detents 177.

The sides 165 of the clips 11 have openings 181 into which the securing projections 175 fit. The detents 177 are engaged by inward-extending snaps 183 in the small openings 185 to retain the clips in the recess. Sloping walls 189 of the holes 181 are engaged by the sloping edges 179 of the securing projections 175 to hold the sides 165 of the clips 11 outward, with the ends 167 in the corners 173 and the aligning projections 171 securely in the receivers 169 and the complementary V-shaped grooves 196. Edges 166 of the ends 167 are tapered inward to guide the receivers 169 into alignment with the aligning projection 171, which occurs in the initial assembly.

To assemble the clips 11 on the trays 109, the clips 11 are bent inward along longitudinal living hinge 163. After receivers 169 are positioned on alignment projections 171, further inward pressing on the back 162 of the strip 161 engages the snaps 183 on the detents 177, holding the clips straightened with ends 167 outward. Enlarged rounded feet 168 on ends 167 ensure that the clips 11 may be pressed inward sufficiently to snap the snaps 183 over the detents 177 and to provide over-the-center clamping.

When assembling the holder sets, preferably the trays 109, mounting edges 131 and recesses 170 are aligned. The strip 161 is bent along living hinge 163, and all clips 11 are connected to the aligned trays 109 at one time.

As shown in Figures 16A and 16B, tear-preventing ribs 164 are positioned at ends of living hinges 113 to resist tearing of the living hinges.

Figure 21 is a detail of a tray 109 showing a fastener recess 139 in its free edge 137.

Figures 22 and 23 show a transparent tray 190 having lugs 191 extending inward from edges of rim 151 to hold a graphics card 193, which is visible through the tray.

Figures 24-29 show a carrying case 200 made with several trays 109, including a first end tray 133 and a deep tray 150 as the second end tray 135, and plural two-sided holder trays 201. The two-sided holder trays 201 are used on the books 140 as well as cases 200. The holder trays 201 have a standard rim 151 and a small inner rim 203 interrupted by finger openings 205 to surround a media disc held on the second side of a two-sided central rosette 207.

The second media disc is held within the thickness of the tray that is established by the rim 151. Reinforcements 209 extend inward from the rim around the first end tray 133.

A handle assembly 210 is added to the deep tray 150. The flexible fastener strap 149 fits within fastener recesses 139 in free edges 137 of the trays. The strip 161 of clips 11 is attached along the connecting edges 131 of the trays, as shown in Figure 25.

A hook 221 is provided on the first end 223 of flexible adjustable fastener strap 149. Hook 221 selectively engages one hole in the array of holes 225 in the central depression 227 on the outer surface of the deep tray 150. Tabs 229 shown in Figure 29 hold the flexible fastener strap in the depression 227.

Figure 26 is a detail of the flexible strip 161 of tray holder clips 11 engaging the trays in the case 200.

Figure 27 is a detail of the fastener strap 149 with the hook 221 on the first end 223 and a connector 145 on the second end 147. Grooves 228 allow bending of the strap 149 around the front corner of the deep tray at an appropriate position according to the number of trays assembled in the carrier 200 or book 140. The deep tray 150 may be replaced with a second end tray 135 shown in Figures 13 and 14, which also has the same outer surface depression 227 and array of holes 225 for engaging the hook 221 according to the total number and height of the stacked trays 109.

Figure 28 shows the handle assembly 210 with bases 211 having sloping side walls 213 which slide into and engage the handle recesses 215 shown in Figure 24. The handle assembly has spacers 217 mounted on the basis and living hinges 218 which connect ends 219 of the handle 212 to the spacers.

Figures 30 and 31 show the front and back of two-sided rosettes 207 used on two-sided trays. The front shown in Figure 30 has a central push button 231 that is connected to legs 233 to flex bases 235 downward and legs 233 and holding lips 234 inward when the button is depressed. Raised surfaces 237 on guides 239 hold a central opening in a disc centered on the rosette.

The rear of rosette 207 is shown in Figure 31. A central cylinder 241 acts as a push button and, when depressed, draws inward legs 243 connected by radial arms 244 to the cylinder 241. The inward movement of the cylinder flexes bases 235 to which the legs 243 are connected and draws lips 244 inward, releasing the disc. Raised surfaces 247 on guides 249 center the disc. The guides 239 and 249 extend through the tray.

Rounded outer surfaces on the holding lips 234 and 244 allow the discs to be shaped onto the rosette.

While the invention has been described with reference to specific embodiments, modifications and variations of the invention may be constructed without departing from the scope of the invention.